Memorandum

February 28, 1995

EOSDIS-IVV-13-95001

To: Joe Gitelman

From: Peter Van Wie

Subject: EOSDIS Test System Acceptance Test Approach

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1. BACKGROUND

This memo outlines key elements of an acceptance test management approach for the EOSDIS Test System (ETS). It is the result of a brief effort to look into issues related to acceptance testing of the ETS, and is therefore preliminary. Many issues which remain to be decided are raised here. In some cases, the issues are identified without a recommendation. In other cases, where the AT program would benefit, a specific recommendation is made. A key objective of the ETS Acceptance Testing activity is to utilize opportunities for overlap of acceptance testing with System Integration and Test (SI&T). This is desired to reduce the cost and time required to checkout the ETS and place it in the hands of users.

2. ORGANIZATION

An ETS Acceptance Test Team will be formed under the auspices of the Code 515 Simulations Operations Center. A civil servant within Code 515 will be designated the ETS Acceptance Test Manager and will lead the ETS AT Team. The Acceptance Test Team should include representatives from Code 505 (ESDIS), Code 515 (SOC), the NMOS contractor, the ETS Development Contractors, the IV&V contractor and possibly other organizations. The ETS Acceptance Test Team should be formed by December 1995. This will provide sufficient time to define the team's charter, assign responsibilities, interface with developer and user organizations, interfacing systems, and the facilities where the ETS will be deployed.

3. RESPONSIBILITIES

Acceptance Test Team Manager. Overall management of the ETS acceptance test program will be the responsibility of the Simulations Operations Section, Code 515.2. A code 515 civil servant will be designated as the ETS Acceptance Test Team Manager by the Head of the Simulations Operations Section. The ETS AT Manager reports to the Head of the Simulations Operations Section and the ETS Manager within the ESDIS Project.

Test Conductor. ETS acceptance testing will be done under the direction of a Test Conductor, appointed by the AT Manager. The Test Conductor will be a member of the Acceptance Test Team. The Test Conductor will be responsible for acceptance test

scheduling, coordinating participating systems and facilities, arranging for test data, travel planning for personnel and equipment and directing the conduct of the actual tests.

IV&V Contractor. The EOSDIS IV&V contractor is responsible for preparation of ETS Acceptance Test criteria. These criteria are to be requirements based and form the basis for definition of test plans. The criteria should guide the AT Team in assessing the results of acceptance tests and determining if the tests were successful. An EOSDIS IV&V contractor will be a member of the ETS Acceptance Test Team. This IV&V member of the team concurs in the ETS Acceptance Test Report prepared by the team.

NMOS Contractor. The NMOS contractor will provide members of the AT Team to prepare the AT Plan, AT Procedures, operate the ETS during acceptance testing, prepare the AT Report and perform related duties assigned by the ETS AT Manager.

ETS Developers. It is recommended that a member of the ETS Developer SI&T organization be a participating member of the ETS Acceptance Test Team. This will facilitate coordination between SI&T activities and acceptance testing.

The ETS Developers are responsible for preparation of ETS Operations Manuals and training courseware and for providing training to Acceptance Team Members, Operations Staff and the IV&V contractor.

Other. Additional members from other organizations may be added to the ETS Acceptance Test Team as needed, by the authority of the Acceptance Test Team Manager.

4. PROCESSES AND PROCEDURES

EOC - SCITF Early Tests. The ETS Acceptance Test Team should review the ETS developer I&T activities for Low Rate System #1 (LRS #1) prior to its possible use in the EOC to SCITF Interface tests in June 1996. Their objective would be to determine if the LRS is ready to support these early tests.

SI&T operational testing. The ETS Developers will conduct initial system integration and testing (SI&T) at the ETS development sites. It is desirable to have the ETS as fully checked out as possible, prior to delivery to the AT Team. Therefore, SI&T should also be done using operational configurations at operational sites. Under current plans, the ETS will receive operational testing at the SOC during SI&T. Plans for SI&T testing of the ETS at WSC are not defined. It is recommended that SI&T testing of the ETS also be performed at WSC. ETS testing at the operational sites should be a shared SI&T / AT activity. AT should witness the SI&T testing. When SI&T is successfully completed, AT should begin testing with development personnel present for consulting and support.

Overlap with SI&T. A key goal of the ETS Acceptance Test approach is to overlap SI&T with AT wherever practical. AT personnel should witness ETS developer integration tests to gain an understanding of the ETS. The SI&T should also be used, on a noninterference basis, as an operations training opportunity. After completion of SI&T

at the SOC the ETS is delivered by the developers to acceptance testing. At this point, configuration control of the ETS transfers Code 515.

Scheduling of tests. The ETS Test Conductor should work with a designated ESDIS Project test coordinator (possibly the Data Systems Manager) to schedule EOSDIS elements for ETSacceptance testing. The Ecom lines used for ETS will be dedicated, so no test scheduling is required. The ESDIS test coordinator can do internal scheduling of EOC, EDOS, and the DAACs. The only institutional element needing scheduling is TDRSS. A point-of-contact for scheduling TDRSS needs to be established.

Collection of test data. Acceptance test plans should identify required test data that must be obtained from others, or generated by the ETS in advance of a test. The ETS Acceptance Test Coordinator is responsible for working with the various organizations to collect the needed data. The quality, quantity and format of this data must be verified by the AT Team in advance of acceptance testing.

Conduct of acceptance tests. Tests are executed under direction of the ETS Acceptance Test Coordinator. The end-to-end test configuration must be identified and controlled throughout the test. Test problems are documented on Discrepancy Reports (DRs) and entered into the discrepancy tracking system. Supporting information such as log files, memory dumps and screen shots are captured, labeled and saved for use in debugging. Test progress and results are annotated on the test procedures worksheets. ETS developer personnel should be present to witness acceptance tests so that they can understand the circumstances related to test failures. Their presence at acceptance testing will facilitate discrepancy correction by the developers. The Test Conductor is responsible for determining when the testing is completed or when the ETS can be made available to developers to resolve discrepancies.

Acceptance test reporting.NMOS members of the ETS AT Team prepare the Acceptance Test Report under the direction of the ETS AT Manager. The IV&V member of the team reviews and concurs. The AT Report is presented to the Head of the Simulations Operations Section for approval and the ESDIS Project ETS Manager for acceptance. Once accepted, the ETS is transitioned to the IV&V contractor for use in verification and validation of the EOSDIS.

5. DISCREPANCY REPORTING

A DR System needs to be identified and made available for use by ETS Acceptance Testing. The Simulations Operations Branch should provide the DR system. NMOS personnel on the ETS Acceptance Test Team should maintain the DR database, DR files from acceptance testing, and provide DR status tracking. The ETS Acceptance Test Team should define the method for approving the opening and closure of DRs. The DR reports and test files should be made available to the ETS developers.

6. CONFIGURATION MANAGEMENT

The ETS Acceptance Test Team should identify the CCB that will be used and the CM procedures for controlling the ETS configuration during acceptance testing. The details of delivery of the ETS to acceptance testing must be worked out and procedures established for maintaining the configuration during acceptance testing. The ETS must not be modified during acceptance testing, without the consent and control of the acceptance test team. The acceptance test team must also be certain of the pedigree of executable software and firmware. If possible, the AT Team should re-build the executables from configuration controlled source code.

All elements of the end-to-end test configuration must be controlled. This requires coordination and cooperation by the external groups participating in ETS acceptance tests. It is important for the AT Team to know, and control the test configuration during acceptance testing. Without proper configuration management test results are difficult or impossible to interpret and discrepancies will not be properly documented. The Acceptance Test Plan for the ETS should identify how test configurations are established, controlled and documented.

Jeff Shi of RMS indicates that Code 521 is deciding on the level to package the VLSI hardware for configuration management. 521 expects to transfer their VLSI deliveries to the Code 515/CSC CCB.

7. ACCESS AND MAINTENANCE

Current ETS plans call for development of one high rate system (HRS) and two low rate systems (LRS). With only one system, the HRS must be shared between AT and development such that critical DRs encountered during AT can be resolved by the developers. Arrangements for this must be worked out between the AT team and the developers.

The ETS VLSI components will be maintained by Code 521 (RMS). ETS software will be maintained by Code 515 (NMOS). The portable HRS at WSC can be maintained at the board-level by local WSC engineers. Arrangements for this type of support should be coordinated with WSC.

8. ETS ACCEPTANCE TEST TEAM ACTIVITY SCHEDLE

A preliminary list of activities for the ETS Acceptance Test Team and proposed schedule dates are given in the following table. Additional team activities should be identified and scheduled by the ETS Acceptance Test Team Manager.

Form ETS Acceptance Test Team	December 95
Prepare ETS Acceptance Test Team Charter	January 96
Define CM approach	March 96
ETS Training	April - August 96
Work out details of ETS delivery to acceptance testing	April 96
IV&V delivery of ETS Acceptance Criteria	April 96
Review LRS build to be made available for EOS-SCITF interface tests	May 96
Deliver ETS Acceptance Test Plan	July 96
Establish DR system	August 96

9. ISSUES

The preceding sections of this memo give the current status of planning for the ETS acceptance testing approach. This represents work-in-progress and more needs to be done. A set of questions on ETS acceptance testing topics was sent to the John McGarry of the SEAS ETS development team. The responses he collected were not received in time to be incorporated in this memorandum and so they have been attached.

The following list summarizes open items that were mentioned earlier and need to be addressed to complete planning of the acceptance testing approach. Additional planning, beyond this list, can be the responsibility of the ETS Acceptance Test Team when it is formed.

1. Acceptance Test Team involvement in SI&T.
2. Developer support during acceptance testing.
3. Developer access to the HRS during the AT test period.
4. DR System
5. Configuration management during acceptance testing.
6. SI&T testing of the ETS at WSC